# FISHERIES MANAGEMENT AND EVALUATION PLAN

**Snake River Summer Steelhead ESU**

**Summer Steelhead and Trout Sport Fisheries**

**in**

**Grande Ronde Basin, Imnaha Basin and Snake River**

**Prepared by**

**Oregon Department of Fish and Wildlife**

**March, 2001**

**Title. Fishery Management and Evaluation Plan –**

Snake River Summer Steelhead ESU,

Summer steelhead and trout fisheries in the Grande Ronde and Imnaha basins, and the mainstem Snake River in Oregon.

**Responsible Management Agency.**


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## SECTION 1. FISHERIES MANAGEMENT

### 1.1) General objectives of the FMEP.

The objective of this FMEP is to provide sport harvest opportunity on hatchery summer steelhead adults, residual steelhead smolts, resident trout, and mountain whitefish, within streams of the Oregon portion of the Snake River Steelhead ESU, in a manner consistent with survival and recovery of listed Snake River summer steelhead trout. The area described in this FMEP includes streams of the Grande Ronde and Imnaha river basins, and the mainstem Snake River and Oregon tributaries to the Snake River, between the Oregon Washington border and Hells Canyon Dam.

#### 1.1.1) List of the "Performance Indicators" for the management objectives.

1. Number of hatchery steelhead harvested within the FMEP area
2. Level of summer steelhead angler effort within the FMEP area
3. Level of effort and catch in key stream trout fisheries
4. Level of compliance with sport fishing regulations
5. Estimated mortality of listed species in steelhead and trout fisheries
6. Wild summer steelhead spawner density in key stream reaches within the FMEP area

### 1.1.2) Description of the relationship and consistency of harvest management with artificial propagation programs.

**Harvest Management**

Existing summer steelhead artificial production programs provide both adult and residual smolt harvest benefits to fisheries within the FMEP area. These hatchery programs are part of two separate fisheries mitigation efforts.

The Lower Snake River Compensation Plan (LSRCP) program mitigates for fish losses due to the construction of the four lower Snake River dams, and the Idaho Power Company (IPC) program provides mitigation for fish losses due to the construction of the Hells Canyon Complex. The key feature of both programs is mitigation for lost harvest opportunity.

We have monitored steelhead fisheries in high use areas of the Grande Ronde and Imnaha basins with statistical creel surveys. Recent results (1991-92 through 1995-96) for the lower Grande Ronde, upper Grande Ronde and Wallowa rivers combined have ranged from 6,027 to 14,532 angler days of effort, harvest of 675 to 3,101 hatchery steelhead, and catch and release of 474 to 900 wild steelhead (Table 1). Results for the Imnaha River have been 219 to 789 angler days, harvest of 24 to 212 hatchery steelhead, and catch and release of 39 to 321 wild steelhead (Table 1). We have not conducted statistical surveys of the fishery in the Snake River, however, punch card estimates of hatchery fish harvest ranged from 1,116 to 2,444 for the 1991-92 through 1993-94 seasons. Angler effort has tended to follow the availability of hatchery fish with effort being high in high return years and low in low return years. Seasonal use by anglers also follows the availability of hatchery fish.

There are no releases of hatchery resident trout into streams within the FMEP area. However, residual hatchery steelhead smolts provide substantial "trout" harvest opportunity some years, within stream reaches near and downstream of smolt release sites.

**This FMEP focuses in part on continued sport angler access to LSRCP and IPC program hatchery steelhead produced specifically to support marked hatchery fish only harvest.** Wild steelhead harvest has been prohibited within the FMEP area since 1979. Adult hatchery steelhead returns allowed harvest opportunity beginning in 1986. Since that time, wild steelhead release regulations have been in place in steelhead streams throughout the ESU; only adipose fin clipped steelhead have been legal to harvest. **It is not anticipated that consumptive fisheries for wild summer steelhead will be reinstated in the foreseeable future.**

Table 1. Effort, catch (fish landed), and harvest (fish kept) estimates for recent summer steelhead fisheries in the Grande Ronde and Imnaha basins.

| | | Angler | Effort | Hatchery | Steelhead | Wild Steelhead |
|---|---|---|---|---|---|---|
| Location | Run Year | Hours | Days | Catch | Harvest | Catch |
| Lower Grande | 1991-92 | 19,617 | 4,862 | 1,373 | 879 | 410 |
| Ronde | 1992-93 | 15,461 | 2,963 | 1,111 | 544 | 573 |
| (OR-WA state | 1993-94 | 12,883 | 2,607 | 252 | 168 | 483 |
| line to Wildcat | 1994-95 | 6,383 | 1,248 | 152 | 107 | 150 |
| Cr., RM 39-54) | 1995-96 | 10,856 | 2,103 | 564 | 300 | 386 |
| Upper Grande | 1991-92 | 11,374 | 4,366 | 1,074 | 708 | 114 |
| Ronde | 1992-93 | 3,030 | 1,887 | 201 | 177 | 22 |
| (Island City to | 1993-94 | 3,230 | 1,172 | 44 | 26 | 59 |
| Meadow Cr., | 1994-95 | 2,043 | 822 | 57 | 27 | 24 |
| RM 155-180) | 1995-96 | 4,578 | 1,666 | 228 | 210 | 76 |
| Wallowa River | 1991-92 | 27,807 | 5,304 | 2,335 | 1,514 | 333 |
| (State Park to | 1992-93 | 23,458 | 4,135 | 1,815 | 1,083 | 305 |
| Rock Cr., | 1993-94 | 14,144 | 2,819 | 556 | 481 | 285 |
| RM 8-18.5) | 1994-95 | 19,047 | 3,957 | 810 | 565 | 300 |
| | 1995-96 | 18,444 | 2,951 | 710 | 495 | 166 |
| Imnaha River | 1991-92 | 3,128 | 762 | 392 | 212 | 321 |
| (Mouth to Big | 1992-93 | 2,910 | 789 | 236 | 171 | 130 |
| Sheep Cr., | 1993-94 | 1,336 | 298 | 29 | 29 | 72 |
| RM 23) | 1994-95 | 1,048 | 219 | 24 | 24 | 39 |
| | 1995-96 | 2,599 | 588 | 180 | 112 | 209 |

**Artificial Production Programs**

Steelhead hatchery programs include:

1) A non-endemic unlisted stock in Grande Ronde basin (Wallowa stock)
2) An endemic listed stock "not essential for recovery" in the Imnaha system
3) An unlisted stock considered "stock of choice" for reintroduction above the Hells Canyon Complex in the Snake River.

The Grande Ronde basin hatchery program utilizes the Wallowa stock derived from adults collected at Snake River dams between 1976 and 1979. The original production program consisted of 1.35 million smolts at 5/lb. Program releases included both direct stream smolt releases and adult outplants at several locations. The program has been modified substantially in recent years in an effort to address concerns regarding impacts to wild steelhead and Chinook populations in the basin

while maintaining harvest benefits. These changes include shifting all smolt releases to existing acclimation facilities and eliminating direct stream releases, utilizing volitional smolt releases, elimination of adult outplants and reduction of program size by 35%. In addition, broodstock modification and changes in release size are being considered to further reduce straying and residualism and the associated impacts to listed stocks within and outside the basin.

The Imnaha basin, Little Sheep Creek steelhead hatchery program produces 330,000 smolts at 5/lb. annually. The program utilizes a hatchery stock derived from adults collected from Little Sheep Creek and incorporates wild fish in the broodstock each generation. Recent program modifications at the request of the Nez Perce Tribe have resulted in the expansion of the area designated for supplementation of natural spawning within the Imnaha basin. Until this change almost all smolt releases occurred at acclimation facilities on Little Sheep Creek and surplus adults were used to actively supplement only Little Sheep Creek. Currently the program releases smolts directly into Big Sheep Creek and surplus adults are transported and released into that system.

The Snake River steelhead hatchery program was developed based upon adults destined for above and within the Hells Canyon complex and trapped at the dams. Wild fish are not routinely incorporated into the broodstock. The hatchery stock is considered to be the stock of choice for reintroduction above the Hells Canyon Complex, if that should ever occur. The program currently produces approximately 600,000 smolts at 4-5/lb. for release below Hells Canyon Dam. The trout fishery within the Snake River focuses on residual hatchery steelhead within the 30-mile reach immediately below Hells Canyon Dam.

All hatchery steelhead produced for release within the FMEP area are marked with adipose fin clips except for those specifically targeted for supplementation in Little Sheep and Big Sheep creeks. ODFW's preferred strategy is to mark all hatchery produced fish but NMFS and others agreed to a different marking strategy for supplementation fish. Steelhead harvest within the FMEP area is restricted to adipose clipped, hatchery origin fish. Mortality of naturally produced steelhead is incidental to fisheries targeting hatchery-produced fish. Trout regulations on 67 miles of the Grande Ronde and Wallowa rivers and lower 23 miles of the Imnaha River are designed to focus harvest on hatchery steelhead residuals by limiting harvest to adipose clipped fish only.

### 1.1.3) General description of the relationship between the FMEP objectives and Federal tribal trust obligations.

The intent of hatchery steelhead programs covered within this FMEP area is to provide fish for harvest in sport as well as tribal fisheries. Columbia River tribal net fisheries will continue to harvest both hatchery and wild steelhead destined for the Grande Ronde and Imnaha basins prior their reaching fisheries covered in this FMEP. Although tribal fishing rights extend to both basins, tribal fishers have

shown little interest in actively pursuing steelhead within these basins. This plan does not address in-river tribal harvest. Harvest impacts proposed in this FMEP will be consistent with and will not preclude proposed future harvest of Snake River ESU steelhead by tribal co-managers. The actions and objectives of this FMEP are subject to and are consistent with provisions of the Columbia River Fish Management Plan (*US v Oregon*).

## 1.2) Fishery management area(s).

### 1.2.1) Description of the geographic boundaries of the management area of this FMEP.

The FMEP includes trout and steelhead fisheries within:

– Grande Ronde River and tributaries within Oregon
– Imnaha River and tributaries
– Snake River and Oregon tributaries between the Oregon/Washington border and Hells Canyon Dam

With only a few reach specific exceptions all streams within this geographic area are open at some time to trout angling. Areas open to steelhead angling are described in Figure 1.

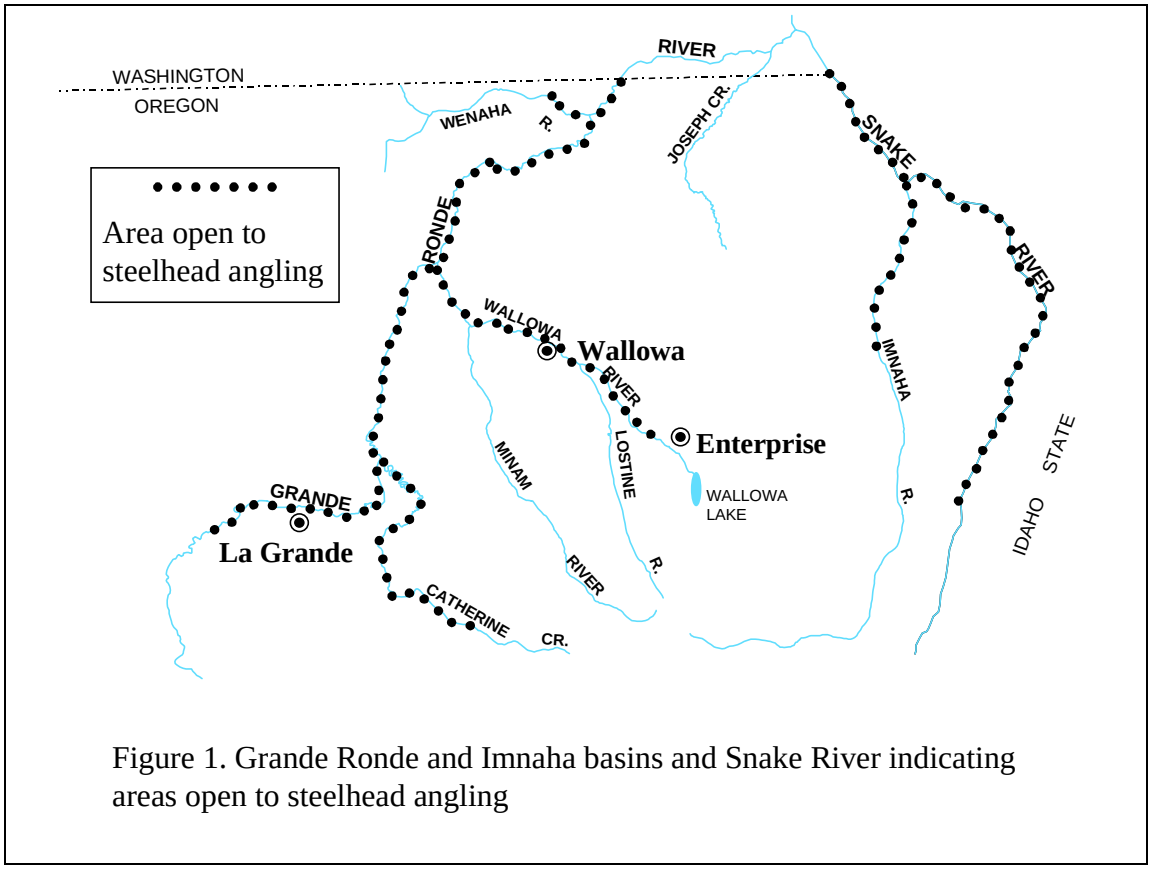


Figure 1. Grande Ronde and Imnaha basins and Snake River indicating areas open to steelhead angling

### 1.2.2) Description of the time periods in which fisheries occur within the management area.

*Streams within Oregon*:
Steelhead season – September 1 through April 15
Trout season in streams – Fourth Saturday in May through October 31
*Snake River*:
Steelhead season - September 1 through April 30
Trout season – Year around

## 1.3) Listed salmon and steelhead affected within the Fishery Management Area specified in section 1.2.

Fisheries covered in this FMEP are most likely to incidentally affect federally ESA listed Snake River summer steelhead (listed as Threatened on October 17, 1997). In addition, ESA listed Snake River spring Chinook and Snake River fall Chinook (both listed as Threatened on May 22, 1992), and Snake River sockeye (listed as Endangered on December 20, 1991) may be affected to a lesser degree.

*Summer steelhead* - Grande Ronde, Imnaha and Snake River summer steelhead are typical of A-run steelhead from the mid-Columbia and Snake basins. Most adults return after one year of ocean rearing (60%). The remainder consists of two-salt returns with an occasional three-salt fish. Females generally predominate with a 60/40 sex ratio on average. Returning adults range in size from 45 to 91 cm and 1.4 to 6.8 kg. Adults generally enter the Columbia River from May through August subsequently entering the natal systems from September through April. Adults utilize accessible spawning habitat throughout each basin. Spawning is initiated in March in lower elevation streams and spring-fed tributaries and continues until early June in higher elevation snowmelt systems. Juveniles utilize a wide range of habitats throughout the basin including areas adjacent to hatchery smolt release locations. Most naturally produced smolts migrate after rearing for two years. A much lower percentage migrates after one or three years. Smolt out-migration from the basins extends from late winter until late spring. Peak smolt movement is associated with increased flow events between mid-April and mid-May (A. Setter, ODFW, personal communication)

A conservative description of potential steelhead population structure within the Grande Ronde and Imnaha basins and within the FMEP associated area of the Snake River is outlined below.

*Grande Ronde Basin*
1. Lower Grande Ronde River
   - Wenaha River
   - Lower Grande Ronde River tributaries in Oregon
2. Joseph Creek and tributaries
3. Wallowa River

- Wallowa River tributaries from North
- Wallowa River tributaries from South (except Minam)
- Prairie Creek
- Minam and tributaries

4. Upper Grande Ronde River
   - Lookingglass
   - Middle Grande Ronde (Grande Ronde tributaries between Wallowa and the upper end of the Grande Ronde Valley except Lookingglass, Catherine and Willow creeks)
   - Willow Creek
   - Catherine Creek
   - Upper Mainstem and tributaries above the Grande Ronde Valley up to and including Meadow Creek
   - South Upper Mainstem (basin above Meadow Creek)

*Imnaha Basin*
- Zumwalt (Camp Creek and west-side Imnaha River tributaries below Big Sheep Creek)
- Lower Imnaha (Eastside Imnaha River tributaries below Big Sheep Creek)
- Big Sheep Creek and tributaries
- Upper Imnaha (Imnaha River and tributaries above Big Sheep Creek)

*Snake River*
- Snake River and tributaries excluding the Imnaha and Salmon rivers from the state line to Hells Canyon Dam

The aforementioned steelhead population structure describes a conservative approach to population delineation due to a lack of data and our desire to minimize risk of population impacts resulting from management decisions. The identified structure is based upon basin size and differences in hydrology, elevation, geology, temperature regime, aspect and spawning time. For the purposes of this plan populations are grouped into management units as indicated to accommodate inference from existing data analysis. Individuals from all above listed populations may be intercepted within FMEP fisheries.

Genetic information describing natural Grande Ronde basin steelhead and the Wallowa hatchery stock is limited. However, electrophoretic analysis by Waples (NMFS, personal communication.) detected consistent genetic differences between samples collected from Chesnimnus Creek (Joseph Creek tributary) and Wallowa hatchery stock steelhead samples. Samples from Deer Creek showed marked similarity to Wallowa hatchery stock samples. DNA analysis of *O. mykiss* samples collected across the Grande Ronde and Imnaha basins is currently underway and should provide further clarification of the population structure within these basins.

*Spring Chinook* – Historically, spring Chinook spawned in headwater areas throughout the Grande Ronde basin. Reduced spawner numbers combined with human

manipulation of spawning areas have resulted in population fragmentation. Individual populations exist within the Minam, Lostine, Wenaha and upper Grande Ronde rivers and upper Wallowa basin and Catherine Creek. Other historic areas of utilization currently receive only occasional spawner use.

Adult spring Chinook enter the Columbia River in March through May. Movement into summer holding areas ranges from April through July. Age 4 fish typically dominate returns to the Grande Ronde. Spawning occurs from early August through September and generally peaks in late August. Emergence of fry begins in January and extends through early May. Fry expand their distribution after emergence in the spring. The extent and direction of fry movement depends on environmental conditions. A fall pre-smolt movement appears to involve a substantial portion of the population in some streams. Juveniles rear for one year and smolt the spring of the year following emergence. Smolt migration from the basins begins in January and extends through early July.

Spring Chinook within the Imnaha basin are considered a single population. Spring Chinook adults from the Imnaha River migrate through Columbia River somewhat later than typical Snake Basin spring Chinook and are some times classified as spring/summer Chinook. In addition, the Imnaha population's adult age structure tends toward older age fish than typical spring Chinook populations.

*Fall Chinook* – Fall Chinook that spawn in the lower reaches of the Grande Ronde and Imnaha rivers are considered segments of a single Snake River population and exhibit similar life histories. Adult Snake River fall Chinook enter the Columbia River in July and migrate into the Snake River from mid-August through October. Spawning occurs from late October through early December, with fry emergence during March and April. Outmigration occurs within 3-4 months following emergence with peak migration past Lower Granite Dam in late June.

*Sockeye* – Adult Redfish Lake (Snake River) sockeye move through a 12-mile reach of the Snake River within the FMEP area during July and August in route to the upper Salmon River. Spawning occurs in October and November. Smolts move through the Snake River from April through June.

### 1.3.1) Description of "critical" and "viable" thresholds for each population (or management unit) consistent with the concepts in the technical document "Viable Salmonid Populations and the Recovery of Evolutionarily Significant Units."

NMFS defines population performance in terms of abundance, productivity, spatial structure, and diversity and provides guidelines for each (McElhany et al. 2000). NMFS identifies abundance guidelines for critical and viable population thresholds. Critical thresholds are those below which populations are at relatively high risk of extinction. Critical population size guidelines are reached if a population is low enough to be subject to risks from: 1) depensatory processes, 2) genetic effects of inbreeding depression or fixation of deleterious mutations, 3) demographic stochasticity, or 4) uncertainty in status evaluations. If a population meets one critical threshold, it would be considered to be at a critically low level. Viability thresholds are those above which populations have negligible risk of extinction due to local factors. Viable population size guidelines are reached when a population is large enough to: 1) survive normal environmental variation, 2) allow compensatory processes to provide resilience to perturbation, 3) maintain genetic diversity, 4) provide important ecological functions, and 5) not risk effects of uncertainty in status evaluations. A population must meet all viability population guidelines to be considered viable.

Productivity or population growth rate guidelines are reached when a population's productivity is such that: 1) abundance can be maintained above the viable level, 2) viability is independent of hatchery subsidy, 3) viability is maintained even during poor ocean conditions, 4) declines in abundance are not sustained, 5) life history traits are not in flux, and 6) conclusions are independent of uncertainty in parameter estimates. Spatial structure guidelines are reached when: 1) number of habitat patches is stable or increasing, 2) stray rates are stable, 3) marginally suitable habitat patches are preserved, 4) refuge source populations are preserved, and 5) uncertainty is taken into account. Diversity guidelines are reached when: 1) variation in life history, morphological, and genetic traits is maintained, 2) natural dispersal processes are maintained, 3) ecological variation is maintained, and 4) effects of uncertainty are considered.

This fishery management plan focuses primarily on *abundance* and *productivity*, the key performance features affected most directly by fishery impacts of the scale we propose. Spatial structure is generally a function of habitat size and distribution. The proposed fisheries do not affect habitat. The small fishery impact rates expected would not reduce population sizes to levels at which spatial effects are exacerbated. The small proposed fishery impact rates on wild fish are not expected to exert selection pressure on any single characteristic sufficiently to affect diversity

NMFS provides limited guidance on fish numbers corresponding to critical and viability thresholds. They discuss hypothetical risks related to genetic processes effective at annual spawning population ranging from 50 to several thousand individuals. (McElhany et al. 2000).

**The viable threshold for summer steelhead populations in the Snake River ESU was set at 20% of the full seeding spawner estimate** based upon the analysis presented by Chilcote (2001) (Table 2). As stated in this report: *"The logic for selecting 20% of 1/**B** as the threshold was based upon the lack of confidence in predicting the response of populations at escapement levels less than this level. The primary reason for this uncertainty was that escapements below these levels have rarely been observed in the data sets. Averaged across all populations and years, only 6% of the spawner escapement data points were less than 0.20/**B**. Therefore, very little information was available to investigate how these populations actually performed at low escapement levels. In light of these shortcomings, it seemed logical that this threshold of uncertainty would suffice as the viable threshold."*

**The method to determine the critical threshold was also based upon the approach described by Chilcote (2001) as follows: "***The critical abundance levels for each population were determined using a population viability assessment (PVA) model**.*** *"In the context of PVA models, Mace and Lande (1991) proposed the following standard for endangerment: a 20% probability of extinction over a period of 10 generations. For the purposes of this report, their classification of "endangerment" was assumed to be synonymous with "critical". Adopting this standard, the critical abundance threshold was defined as the number of spawners, that if left alone to naturally reproduce for 50 years (approximately 10 generations) would result in the extinction of the population more than 20% of the time. This critical abundance was estimated for each population by seeding each PVA model run with fewer and fewer initial spawners until a 20% extinction probability was achieved."*

Population viability analysis is not available for all steelhead management units previously described within the FMEP area. However**, analysis of spawning survey data from a number of Grande Ronde basin streams and one Imnaha basin stream suggests steelhead populations within the basin are viable and resilient** (Chilcote, 2001). Furthermore, that analysis determined that productivity of these populations was such that they would remain viable and productive under harvest or mortality levels modestly higher than current levels. We utilized results of analysis completed to infer population status in adjacent management units (Table 2).

Table 2. List of the natural steelhead populations, "Viable Salmonid Population" thresholds, and associated hatchery stocks within the Grande Ronde basin (Chilcote, 2001).

| Management Units | Critical Thresholds (Abundance in spawners/mile) | Viable Thresholds (Abundance in spawners/mile) | Associated hatchery stock(s) |
|---|---|---|---|
| Imnaha | Abundance 0.4 | Abundance: 1.2 replacement rate =1 | Little Sheep Cr. Stock summer steelhead (# 29) |
| Lower Grande Ronde [1] | Abundance: 0.2 | Abundance: 0.7 Productivity: replacement rate =1 | |
| Joseph Creek | Abundance: 0.2 | Abundance: 0.7 Productivity: replacement rate =1 | |
| Wallowa River [2] | Abundance: 0.3 | Abundance: 0.8 Productivity: replacement rate =1 | Wallowa stock summer steelhead (#56) |
| Upper Grande Ronde (Middle Grande Ronde) | Abundance: 0.3 | Abundance: 0.8 Productivity: replacement rate =1 | |
| Upper Grande Ronde (Upper Grande Ronde) | Abundance: 0.1 | Abundance: 0.5 Productivity: replacement rate =1 | |

[1] Inference from adjacent Joseph Creek management unit

[2] Inference from adjacent Middle Grande Ronde management unit

### 1.3.2) Description of the current status of each population (or management unit) relative to its "Viable Salmonid Population thresholds" described above. Include abundance and/or escapement estimates for as many years as possible.

General tends in observed steelhead spawner abundance within the basins can be represented as reaching a low in the late 1970s, gradually increasing to a peak in the mid-1980s, and declining to another low in the late 1990s before recovering slightly. Average abundance over the last 6 years for all basin steelhead populations examined exceeded the viable threshold identified (Table 3).

Table 3. Previous 6-year average steelhead spawner density (spawners per mile) for FMEP area population units examined (Chilcote, 2001)

| Population | Sub-population | Observed Abundance | Viable Threshold | Critical Threshold |
|---|---|---|---|---|
| Joseph | | 4.6 | 0.7 | 0.2 |
| Upper Grande Ronde | Mid – Grande Ronde | 2.2 | 0.8 | 0.3 |
| Imnaha | | 4.7 | 1.2 | 0.4 |
| Upper Grande Ronde | Upper Grande Ronde | 3.3 | 0.5 | 0.1 |

Steelhead spawner abundance is based upon over 85 miles of redd surveys within the Grande Ronde and Imnaha basins (Figure 2 and Table 4).

Figure 2. Grande Ronde basin summer steelhead index area spawning ground counts, 1960-1998 (data from La Grande and Wallowa Districts combined).

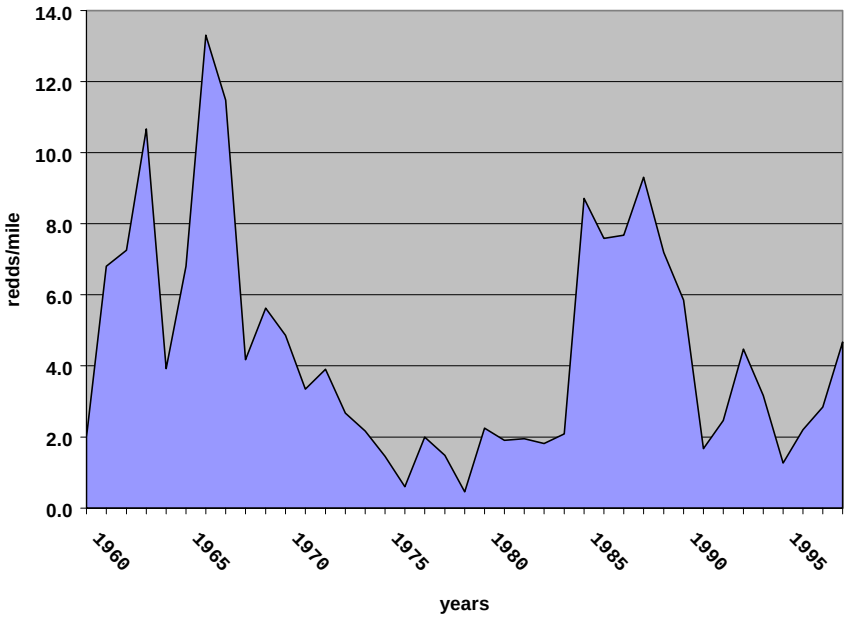

Table 4. Steelhead spawning survey data (spawners per mile) for some streams within the Grande Ronde Basin, 1988-2000. Blank cells indicate no survey (Data from Grande Ronde Watershed District files).

| POP. UNIT | Prairie Cr. | S Wallowa | N Wallowa | Joseph Creek | | | | | | | | | M.Grande Ronde | U. Grande Ronde | | | S.Grande Ronde |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Miles*** | 2 | 5 | 5 | 2.5 | 1 | 12 | 6 | 10 | 1 | 6 | 1 | 5 | 2.5 | 7 | 2 | 6 | 4 |
| **STREAM** | Prairie Cr. | Wallowa R. | Whiskey Cr. | Butte Cr. | S. FK.Chesnimnus | Crow Cr. | Devils Run Cr. | Elk Cr. | McCarty Gu. | Peavine Cr. | Summit Cr. | Swamp Cr. | Phillips Cr | Meadow Cr. | McCoy Cr. | Five Points Cr. | Fly Cr. |
| **Year** | | | | | | | | | | | | | | | | | |
| **1988** | 23.0 | 2.7 | 22.3 | 0.5 | 24.3 | 8.7 | 23.4 | 12.2 | 0.0 | 22.7 | 67.5 | 8.4 | 2.7 | 7.9 | 3.4 | 2.5 | 13.8 |
| **1989** | 8.8 | 3.0 | 17.2 | 0.9 | 16.2 | 9.5 | 24.5 | 15.1 | 6.8 | 10.6 | 29.7 | 11.1 | 2.2 | 1.5 | 2.0 | 1.4 | 1.7 |
| **1990** | 14.9 | 3.2 | 11.8 | 2.2 | 5.4 | 10.4 | 5.6 | 10.7 | 1.4 | 11.9 | 12.2 | 14.0 | 2.7 | 2.9 | 2.0 | 2.5 | 1.0 |
| **1991** | 2.7 | 0.8 | 4.1 | 0.0 | 0.0 | 2.5 | 0.9 | 4.5 | 0.0 | 1.4 | 2.7 | 0.0 | | | | | |
| **1992** | 11.5 | 2.4 | 11.0 | 0.5 | 0.0 | 2.8 | 4.1 | 4.3 | 0.0 | 5.9 | 6.8 | 1.4 | 8.6 | 4.6 | 1.4 | 2.5 | 7.9 |
| **1993** | 9.5 | 0.0 | 3.7 | 0.5 | 2.7 | 5.1 | 15.3 | 12.2 | 0.0 | 5.6 | 9.5 | 14.9 | 2.2 | 1.7 | 4.7 | 1.4 | 1.4 |
| **1994** | 16.2 | 1.6 | 7.8 | 0.0 | 2.7 | 2.6 | 9.5 | 6.2 | 0.0 | 5.2 | 9.5 | 0.5 | 1.6 | 2.5 | 0.0 | 4.5 | 1.4 |
| **1995** | 5.4 | 1.4 | | 0.0 | 5.4 | 0.5 | | 1.8 | 0.0 | | 1.4 | 2.2 | 2.7 | 1.7 | 2.0 | 2.7 | 1.7 |
| **1996** | 16.9 | 3.5 | 3.4 | 1.6 | 5.4 | 1.2 | 4.3 | 2.7 | 0.0 | 4.1 | 4.1 | 1.9 | 2.2 | 1.7 | 3.4 | 4.5 | 1.4 |
| **1997** | 17.6 | | 4.6 | 4.9 | 6.8 | 2.5 | 4.1 | 3.9 | 0.0 | 2.7 | 4.1 | 1.9 | 1.1 | 3.7 | 6.8 | 5.2 | 2.3 |
| **1998** | 20.9 | | 8.4 | 2.2 | | 2.6 | | 9.0 | 5.4 | 13.3 | | 4.9 | 4.3 | 5.2 | 7.4 | 3.4 | 2.3 |
| **1999** | 31.1 | | 5.7 | 5.4 | 8.1 | 4.1 | 10.8 | 4.7 | 0.0 | 3.6 | 8.1 | 8.1 | 2.2 | 1.4 | 0.7 | 3.6 | |
| **2000** | 37.1 | | 6.8 | 2.2 | 13.5 | 2.5 | 5.9 | 5.9 | 1.4 | 6.1 | 17.6 | 9.2 | 1.1 | 0.8 | 0.0 | 4.1 | 2.7 |

* Miles surveyed varied over time in some survey units, value given represents most years.

### 1.4) Harvest Regime

The primary focus of this FMEP is on fisheries that target hatchery adult summer steelhead and resident trout. The majority of potential fishery-related impacts to wild steelhead are thought to occur in the adult steelhead fishery. Sport angling impacts to ESA listed Chinook and sockeye salmon are believed to be immeasurably small.

The Oregon Department of Fish and Wildlife will manage fisheries in the Snake River ESU to selectively harvest adult hatchery steelhead. The selective fisheries on hatchery steelhead require the mandatory release of incidentally caught wild fish. This regime has

been structured and implemented over a number of years to provide important protection to both adult and juvenile steelhead. Modification of hatchery programs for summer steelhead and resident trout has substantially reduced, but not eliminated the potential for fishery impacts to native wild steelhead adults and juveniles. ODFW believes the proposed harvest regime will not jeopardize the survival and recovery of the ESA listed steelhead in the Snake River ESU.

### 1.4.1) Provide escapement objectives and/or maximum exploitation rates for each population (or management unit) based on its status.

Available fishery information suggests that **the existing catch and release fisheries result in fishing mortalities which approximates 2% of the population, much below the harvest rate limits of 20% proposed in this plan (see following discussion).** Again, the long-term intent in this FMEP is to provide consumptive fisheries for hatchery summer steelhead while minimizing fishery-associated mortality on wild summer steelhead. We do not anticipate the re-establishment of consumptive fisheries for wild summer steelhead in the foreseeable future.

To assess potentially acceptable fishery related impacts, maximum exploitation rates were developed for each population. However, the term "fishery mortality rate" was used instead of "exploitation rate" to clarify that under current wild fish catch and release regulations only a small fraction of the fish that are caught are actually removed from the spawning population (they die). For example, if 50% of a wild steelhead population is caught in a sport fishery and the post-release mortality rate of these caught fish is 5%, then the fishery mortality rate is 5% of 50% or 2.5%.

Maximum fishery mortality rates for each population were developed based on a PVA analysis described by Chilcote (2001). The assessment entailed performing a series of PVA model runs for a range of different assumed adult mortality rates (AMR) for 27 populations of Oregon steelhead. For each population the probability of extinction (PE) over a 50-year time period was estimated for 16 mortality rates between 0% and 75%.

This analysis lead to several findings, applicable to nearly all populations. First, for most populations when fishing-related mortality rates were less than 35%, the probability of extinction was 0.00.

Secondly, once a mortality rate was found that increased the probability of extinction above 0.00, an increment of an additional 20% in mortality rate was usually sufficient to result in a probability of extinction of 1.00. Since the transition from low risk to high risk happens so rapidly once the threshold (or critical) mortality rate is exceeded, management strategies should set a limit on maximum mortality rates at some level considerable less than this trigger point. To do otherwise leaves no room for logic errors in the model used to forecast these impacts, nor does it allow for any error in the actual measurement of mortality rates. Since for most populations the trigger point is a mortality rate of 35% or higher Chilcote (2001) contends that a mortality rate limit of

20% is a reasonable conservation standard for most steelhead populations in Oregon. Therefore, **the 20% maximum fishery mortality rate limit was used for all populations in the Snake River ESU (Table 5).**

Table 5. PVA simulations of estimated probability of extinction in 50 years for 5 populations of Oregon steelhead under 16 different hypothetical adult mortality rates.

| Population | Percent Adult Mortality Rate | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **0** | **5** | **10** | **15** | **20** | **25** | **30** | **35** | **40** | **45** | **50** | **55** | **60** | **65** | **70** | **75** |
| Upper Grande Ronde | | | | | | | | | | | | .00 | .03 | .27 | .78 | .99 |
| Middle Grande Ronde | | | | | | | .00 | .01 | .13 | .77 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Joseph | | | | | | | | | | | | | | | .00 | .29 |
| Imnaha | | | | | | | | | | .00 | .01 | .09 | .74 | 1.0 | 1.0 | 1.0 |

Estimates of maximum incidental fishery mortality rates for listed steelhead populations associated with steelhead and trout fisheries within the FMEP are based on liberal estimates of hooking rates in the various fisheries and followed by estimates of hooking related mortality on the proportions of the populations encountered in the fisheries.

Maximum hooking mortality rates utilized in the analysis of affects included: 1) 5% for adult steelhead caught and released in steelhead fisheries (Hooton, 1987), 2) 25% for juvenile steelhead caught and released in trout fisheries where bait is allowed, and 3) 6% for juvenile steelhead in areas where bait is not allowed (Wydoski, 1977).

Hooking rates used in the analysis include: 1) a 30% encounter rate on the population of natural adult steelhead in the Grande Ronde basin steelhead fishery during the relatively high intensity period from fall through spring, and 2) a 15 % encounter rate on wild steelhead in the more remote, less intense Imnaha and Snake River steelhead fisheries.

We estimated hooking rate for wild fish via the ratio between estimated marked hatchery fish caught (including those released) in the Grande Ronde basin fishery and the estimate of harvest plus escapement in the basin for hatchery fish. The ratio ranged from 61% to 115% for run years 1991-92 to 1995-96 with a mean of 93%. Several factors suggest a considerably lower hooking rate for wild steelhead in the Grande Ronde basin. For run years 1991-92 through 1995-96 from 31% to 69% (mean 44%) of hatchery fish catch occurred within the Wallowa River in areas where hatchery fish concentrate at release sites (Flesher, et.al., 1992, 1993, 1994, 1995, 1996). Catch in these areas is almost entirely hatchery fish. In addition, a substantial portion of wild steelhead returning the Grande Ronde basin either are not subject to fisheries within the FMEP (Joseph Creek system) or are subject to only slight exposure to the fishery (the Wenaha River, lower and upper Grande Ronde tributaries). Based upon these mitigating circumstances **we estimated wild steelhead hooking rate for the Grande Ronde wild steelhead to be one third of that observed for hatchery fish or 30 %**. Furthermore, based on relative intensity of fisheries in the more remote, less accessible Imnaha basin and Snake River we estimated wild steelhead hooking rates for those areas at 15%. Hooking and releasing wild fish is not expected to impact reproductive success (Pettit, 1977). The resulting estimates of hooking related mortality are presented in Table 6.

Table 6. Estimated maximum annual incidental mortality rates for listed populations in fisheries covered within this FMEP.

| | |
|---|---|
| Snake River steelhead | < 1% |
| Grande Ronde summer steelhead | < 2% |
| Imnaha summer steelhead | < 1% |

Our assumptions regarding steelhead fisheries were validated through analysis using wild steelhead catch data from creel surveys, counts of wild steelhead at Lower Granite Dam, and LSRCP apportioning of wild steelhead escapement above Lower Granite Dam. This analysis of potential impact to wild steelhead returning to the Grande Ronde and Imnaha Rivers from sport fisheries in Oregon assuming a 5.0% mortality of hooked and released fish, the upper range of mortalities in the studies cited above. The resulting impact on wild steelhead populations would be less than 3.0% based on this analysis (Table 7). This analysis is supported by the available literature and suggests steelhead sport fisheries in Oregon could continue under wild release regulations without serious impact to wild steelhead populations.

Most steelhead juveniles migrate as smolts before becoming legal size in the trout fishery (8 inch minimum length and late May opening except for the Snake River). Most juvenile steelhead utilize remote habitat that receives little angler attention.

Oregon State Police (OSP) enforcement patrols have difficulty locating trout anglers within the most productive steelhead rearing areas including the Joseph Creek and lower, middle and upper Grande Ronde tributary basins. Trout angling in the Snake River focuses on the thirty miles of stream immediately below Hells Canyon Dam and above most steelhead spawning tributaries. As a result of limited trout angler use across much of the ESU we estimated less than 1% of juvenile steelhead are hooked and released in trout fisheries within the FMEP area annually.

Table 7. Estimated mortality of hooked and released wild steelhead in Grande Ronde and Imnaha sport fisheries 1989-1995.

**Grande Ronde River**

| Run Year[1] | Lower Granite Wild Count | Grande Ronde Wild @ 15%[2] | Est. Wild Catch in OR[3] | # Morts @ 5%[4] | % Morts in Population |
|---|---|---|---|---|---|
| 89-90 | 24,751 | 3,713 | 835 | 42 | 1.13% |
| 90-91 | 10,893 | 1,634 | 270 | 14 | 0.09% |
| 91-92 | 17,087 | 2,563 | 1,117 | 56 | 2.18% |
| 92-93 | 22,545 | 3,382 | 900 | 45 | 1.33% |
| 93-94 | 10,229 | 1,534 | 874 | 44 | 2.87% |
| 94-95 | 7,942 | 1,191 | 518 | 26 | 2.18% |

**Imnaha River**

| Run Year | Lower Granite Wild Count | Imnaha Wild @ 4% | Est. Wild Catch | # Morts @ 5% | % Morts in Population |
|---|---|---|---|---|---|
| 89-90 | 24,751 | 990 | 43 | 2 | 0.20% |
| 90-91 | 10,893 | 436 | 50 | 3 | 0.69% |
| 91-92 | 17,087 | 683 | 321 | 16 | 2.34% |
| 92-93 | 22,545 | 902 | 130 | 7 | 0.78% |
| 93-94 | 10,229 | 409 | 72 | 4 | 0.98% |
| 94-95 | 7,942 | 318 | 39 | 2 | 0.63% |

[1] June through May

[2] from Table 2, Page 13 of Lower Snake River Fish and Wildlife Compensation Plan

[3] Total of wild steelhead catch and release estimates from lower Grande Ronde (Oregon section only), upper Grande Ronde, Wallowa, Rondowa, and Catherine Creek creel surveys.

[4] from Hooton, 1987. The author reported on two studies of steelhead hook-and-release mortality; one resulted in a mean mortality of 3.4% and the other 5.1%. I used 5.0% for this analysis.

### 1.4.2) Description of how the fisheries will be managed to conserve the weakest population or management unit.

Sport steelhead and trout angling in the Snake River ESU is currently managed to provide significant protection to the listed wild stocks. Mandatory wild release regulations for adult steelhead have been in effect in the Snake River ESU since 1986 and will continue into the foreseeable future.

As discussed in Section 1.4.1 above, fishing mortality rates on wild steelhead stocks in the Snake River ESU will be restricted to hook and release mortality (estimated at less than 5% per hooking event) under this FMEP. **The cumulative effect will be that less than 2% of the annual wild steelhead return to the Snake River ESU will be lost to hook and release mortality as a result of sport angling.**

Harvest in steelhead fisheries within the FMEP is restricted to marked hatchery fish only. Legal bag limit for hatchery origin steelhead is set at two fish per day. Steelhead populations within the FMEP appear, based on PVA (section 1.3.1), to be able to sustain existing incidental fisheries related mortality without jeopardy. Much of the hatchery steelhead angler effort is concentrated in areas associated with smolt release sites. Catch at these sites includes a very low percentage of wild fish.

Substantial protection for wild trout and juvenile steelhead is also being provided under the current harvest management strategy. A late May trout season opening date and an 8-inch minimum length for trout protect juvenile steelhead from direct harvest. The bulk of steelhead smolts are well on their seaward migration prior to the end of May. As a result, trout fishery impacts to juvenile steelhead are generally limited to catch and release of under sized fish.

In addition, trout harvest is restricted to adipose clipped only residual hatchery steelhead smolts in 67 miles of the mainstem Grande Ronde and Wallowa rivers and 23 miles of the mainstem Imnaha River. These special regulation areas include most of the smolt migration corridors on the Grande Ronde, Imnaha and Wallowa rivers, as well as encompass areas most used by trout anglers. These regulations protect wild trout and juvenile steelhead from harvest in these areas and reduce competition from residual steelhead. Incidental fisheries related mortality of other listed species within the FMEP are relatively insignificant since juvenile Chinook salmon are too small to be generally caught or to be legal for harvest in trout fisheries.

It is assumed that continued implementation of the conservation measures described in this FMEP would *generally* preclude the need to impose additional restrictions on the fisheries. However, in the event that populations decrease in abundance to levels less than the viable and critical thresholds given in Table 2, additional, more conservative measures will be implemented to limit fishery associated mortalities on wild fish will be implemented. **If the viable threshold values are reached in any of the Snake River ESU populations, then additional time, area**

**and/or fishing gear restrictions would be proposed to further reduce sport hook and release mortality to the affected wild steelhead. If the critical threshold values are reached for any population, total steelhead fishery closure during the critical period(s) needed to protect adult and juvenile summer steelhead would likely be proposed.**

#### 1.4.3) Demonstrate that the harvest regime is consistent with the conservation and recovery of commingled natural-origin populations in areas where artificially propagated fish predominate.

The steelhead harvest strategy in the Snake River ESU is based solely on harvest of fin marked, hatchery steelhead. Only steelhead with a missing adipose fin can legally be retained by sport anglers. In addition, steelhead angling is essentially restricted to migration corridors, with the vast majority of spawning areas closed to steelhead angling. **No hatchery steelhead deemed essential to the survival of the species have been documented in Snake River ESU.** Season and area closures, gear restrictions, and a consistently high level of wildlife law enforcement all combine to minimize the loss of wild steelhead in the ESU. . Observations by the Oregon State Police (OSP) indicate angler compliance with wild release regulations is high (in excess of 90%, see Section 3.4). It is estimated that the adult steelhead mortality rate associated with existing catch and release fisheries is 5% or less of the fish handled based on data collected by Hooton (1987).

### 1.5) Annual Implementation of the Fisheries

The Oregon Fish and Wildlife Commission (Commission) adopts angling regulations every year with and extensive public involvement process every four years. This process begins about one year in advance of when specific regulations are actually adopted. Current regulations require release of wild (unmarked) steelhead in the Snake River ESU. There is no sport fishery planned that would allow retention of wild steelhead in the ESU.

In season run projections based upon steelhead counts at Lower Granite during the early winter are used to project hatchery returns to the Imnaha and Grande Ronde systems. Occasionally hatchery steelhead harvest is curtailed to protect adults for hatchery broodstock. Low return years for hatchery steelhead populations generally coincide with low natural fish returns. As a result managing the fishery to protect hatchery broodstock accomplishes increased listed stock protection as well.

There is also a process in place to implement regulations on a much shorter time schedule than every four years that addresses emergency conditions. These emergency regulations can be adopted by the Commission within 2 weeks if a Commission meeting is scheduled near the same date. The Commission has also delegated to the Director of ODFW the authority to adopt emergency regulations. If the Director adopts emergency regulations, they can be implemented within a matter of days from the time they are submitted.

## SECTION 2. EFFECTS ON ESA-LISTED SALMONIDS

### 2.1) Description of the biologically-based rationale demonstrating that the fisheries management strategies will not appreciably reduce the likelihood of survival and recovery of the affected ESU(s) in the wild.

#### 2.1.1) Description of which fisheries affect each population (or management unit).

Columbia River treaty, commercial gill net and sport fisheries affect all sub-populations within the Snake River ESU. The estimated mortality associated with mainstem Columbia sport and the Zone 6 tribal treaty fishery has averaged 9.6% for the last 6 years (Chilcote 2001, ODFW and WDFW 2000, and Curt Melcher 2000, personal communication).

This plan will address only fisheries that occur in the Oregon portions of the Snake, Grande Ronde and Imnaha basins. Catch estimates within these basins are based upon statistical creel surveys and angler steelhead punch card estimates. Since 1986 there has not been a targeted harvest on wild steelhead fish within the ESU. Under this scenario, we estimate approximately 2.0% of the wild steelhead population is lost due to catch and release hooking mortality (see Section 1.4.2).

Trout fisheries protect juvenile steelhead through an 8-inch minimum size limit and by restricting the trout season to times when smolts are the least vulnerable to harvest (the fourth Saturday in May to October 31). Special regulation areas on 67 miles of the mainstem Grande Ronde and Wallowa rivers and lower 23 miles of the mainstem Imnaha River protect juvenile steelhead in migration corridors and are designed to focus trout harvest on hatchery steelhead residual smolts, by limiting harvest to adipose clipped trout only.

Trout angling effort remains relatively low in streams throughout most of the Snake River ESU due to the semi-remote nature of the area and the lack of resident trout stocking in streams. No stocking of hatchery rainbow trout occurs within any stream in the Snake River ESU. The Department has transferred historic stocking of streams to standing water bodies in an attempt to focus angler effort in those areas. Due to these factors, it is estimated that only a small percentage (<1%) of the juvenile steelhead rearing in the Snake River ESU would be caught and released during the trout fishery because of the current angling regulations (closure periods and 8" minimum) and the low intensity nature of the fishery.

#### 2.1.2) Assessment of how the harvest regime will not likely result in changes to the biological characteristics of the affected ESUs.

The current and proposed harvest regime for Snake River ESU steelhead and trout, has not and will not result in changes to the biological characteristics of wild Snake River ESU steelhead.

These characteristics have been and will continue to be monitored as part of the monitoring and evaluation portion as described in Section 3.1 of this FMEP. Regulations requiring catch and release of wild steelhead have been in effect since 1986. Mortality to Snake River ESU wild steelhead by sport anglers, as a result of incidental hook and release mortality, has not and will not affect the biological characteristics of the listed steelhead.

Any fisheries management strategy that includes harvest has both direct and indirect harvest. Direct harvest takes place when legally caught fish are retained as part of the daily limit. This FMEP does not propose direct harvest of wild steelhead in the Snake River ESU in the foreseeable future. This FMEP focuses on maintaining wild harvest rates that are consistent with recovery of the ESU populations. The small hook and release mortality rates to Snake River ESU steelhead covered under this plan are not expected to exert selective pressure on any single characteristic that will affect genetic diversity. Since both the existing and proposed fisheries would encompass the entire spectrum of run timing and be conducted on a mix of all the sub-populations, the probability of changing biological characteristics is very small.

Fisheries impact estimates (Section 1.4.1) on the order of a few percent for the most impacted populations covered in this FMEP are relatively insignificant compared to natural mortality and out of basin mortality factors such as non-selective net harvest and dam mortality.

Section 1.3.1 describes results of population viability analysis for steelhead. In his analysis Chilcote (2001) suggested that wild steelhead populations examined within the Grande Ronde and Imnaha basins were viable under the existing described harvest regime. Furthermore, he found that those populations were capable of sustaining modest increases in mortality.

### 2.1.3) Comparison of harvest impacts in previous years and the harvest impacts anticipated to occur under the harvest regime in this FMEP.

Harvest rates of adult steelhead in the Snake River ESU prior to the start of mandatory wild release in 1986 are unknown. Cramer et al (1997) reviewed harvest rates of adult steelhead in sport fisheries in Oregon and Washington prior to wild release regulations and concluded that harvest rates on wild winter and summer steelhead were in the neighborhood of 50%. Harvest rates in the Snake River ESU may have been of this magnitude. **Current harvest rates of wild adult steelhead in the FMEP area is estimated to be approximately 2%**

Past harvest impacts to juvenile steelhead as a result of trout fisheries in the unknown. Cramer et al. (1997) were of the opinion that the greatest sport harvest of steelhead in recent times may have been on juveniles taken in trout fisheries, rather than on adults. Angling mortality to juvenile steelhead in the Wallowa, Grande Ronde and Imnaha rivers was likely heightened as the result of legal trout stocking in these river segments prior to 1996**.** The discontinuation of all resident trout stocking in streams, as well as more restrictive angling regulations presently in place, provide significantly greater protection to juvenile steelhead from angling mortality. Catch and release regulations for wild redband trout in the mainstem

Grande Ronde and Wallowa rivers, as well as the general presence of redband trout populations buffering juvenile steelhead from angling mortality, all combine to provide juvenile steelhead very significant protection from angling mortality.

Illegal sport take of adult steelhead has been reduced to extremely low levels through a combination of education, peer pressure and aggressive enforcement. Hook and release mortality has also been reduced to what managers believe to be a low level through education and peer pressure. Harvest rates are anticipated to not change and will continue to remain low under the harvest regime described by this document.

We expect future incidental mortality to listed species associated with FMEP fisheries to be consistent with that seen in the recent past (Section 1.4.1).

### 2.1.4) Description of additional fishery impacts not addressed within this FMEP for the listed ESUs specified in section 1.3. Account for harvest impacts in previous year and the impacts expected in the future.

Snake River ESU summer steelhead are intercepted in commercial, sport and tribal net fisheries in the Columbia and Snake rivers. The impacts of these fisheries to listed stocks have been reduced substantially from historic levels. Harvest of listed Snake River ESU steelhead has recently been limited almost exclusively to tribal harvest.

Harvest rates for A-run wild summer steelhead in Columbia River Zone 6 tribal fisheries have ranged from 7.8% to 10.4% with a mean of 9.3% the Bonneville Dam wild count for years 1995-1999 (ODFW and WDFW, 2000). As an indication of potential handling mortality associated with the lower Columbia River sport harvest, an estimated range of 2.0% to 3.4% (mean 2.5%) of A-run summer steelhead passing Bonneville Dam were harvested in the sport fishery for years 1995-1999. Additional, incidental handling mortality of wild steelhead bound for the FMEP area also occurs in sport fisheries in the Snake River and lower Grande Ronde rivers in Washington and Idaho. Harvest rates for Wallowa stock hatchery steelhead in these fisheries was 18%, 17.7% and 16.1% for run years 1994-95, 1995-96 and 1996-97, respectively (M. Flesher, ODFW, personal communication).

Based on the fisheries characteristics we believe the rate of wild fish catch and release is similar to estimated harvest rates for hatchery fish. Utilizing an estimated 5% hooking and handling mortality for sport caught steelhead (Hooton, 1987), incidental fisheries mortality in the combined Columbia, Snake and Grande Ronde sport fisheries for populations of steelhead bound for the FMEP area is estimated to be approximately 1%.

Table 8 presents a run reconstruction for the Wallowa hatchery stock steelhead.

Table 8. Run reconstruction for Wallowa stock hatchery steelhead indicating contribution to various fisheries and escapement based on coded-wire tag recovery expansions for run years 1987-88 through 1996-97.

| Run Year | Ocean | Columbia Net | Columbia Sport | Deschutes[1] | Snake Sport[2] | Escapement[3] | Run Year Total |
|---|---|---|---|---|---|---|---|
| **1987-88** | 0 | 2,240 | 133 | 165 | 595 | 2,061 | 5,194 |
| **1988-89** | 2 | 4,376 | 930 | 133 | 1,175 | 2,203 | 8,819 |
| **1989-90** | 15 | 2,890 | 804 | 846 | 4,157 | 2,000 | 10,712 |
| **1990-91** | 27 | 2,684 | 356 | 761 | 126 | 1,274 | 5,228 |
| **1991-92** | 67 | 4,559 | 1,238 | 2,264 | 4,383 | 2,554 | 15,065 |
| **1992-93** | 58 | 4,878 | 1,256 | 875 | 3,641 | 2,189 | 12,897 |
| **1993-94** | 0 | 2,795 | 1,132 | 417 | 2,951 | 1,346 | 8,641 |
| **1994-95** | 14 | 900 | 654 | 264 | 1,519 | 856 | 4,207 |
| **1995-96** | 0 | 1,365 | 1,264 | 380 | 2,403 | 2,476 | 7,888 |
| **1996-97** | 0 | 1,113 | 385 | 466 | 5,073 | 3,949 | 10,986 |
| **Mean Harvest/ Escapement** | **18** | **2,780** | **815** | **657** | **2,602** | **2,092** | **8,964** |
| **Ave. % of run** | **0.2** | **31.0** | **9.1** | **7.3** | **29.0** | **23.3** | **100** |

[1] Includes sport and Tribal C and S harvest
[2] Includes Snake River and Tributaries (Program Compensation Area)
[3] Includes recoveries at hatchery weirs and strays within and outside the Snake basin (most recoveries within Compensation Area)

## SECTION 3. MONITORING AND EVALUATION

### 3.1) Description of the specific monitoring of the "Performance Indicators" listed in section 1.1.3.

*1. Number of hatchery steelhead harvested within the FMEP area*

Hatchery fish harvest by stream will be estimated for each run year via salmon/steelhead tag return data. Due to the extensive amount of data compilation and correction in this process data summary will lag several years behind angling season completion.

*2. Level of summer steelhead angler effort within the FMEP area*

Statistically valid estimates of catch rate for steelhead by stream reach will be accomplished for the Grand Ronde, Wallowa and Imnaha rivers via creel interviews. The combination of tag return and creel data will allow estimation of total annual effort in these areas.

*3. Level of effort and catch in key stream trout fisheries*
As funding is available creel studies will be conducted to determine trout fishery catch and effort in high use stream reaches, i.e. Wallowa and Imnaha rivers. Number, species, size and origin of trout caught will be utilized to estimate impacts to listed species.

*4. Level of compliance with sport fishing regulations*
Compliance with sport fishing regulations will be monitored via enforcement officer angler contacts in the field. Enforcement officers provide angler education through hundreds of contacts annually during the angling seasons. These contacts often result in discussion regarding proper release techniques and rational for existing regulations.

*5. Estimated mortality of listed species in steelhead and trout fisheries*
Steelhead and trout fishery creel surveys will provide data for estimating handling rates and resulting incidental mortality rates for listed fish.

*6. Wild summer steelhead spawner density in key stream reaches within the FMEP area*
Annual steelhead spawning surveys will be conducted in key stream reaches within the FMEP. Trend in escapement will be tracked via comparison of counts within index reaches counted annually since the 1960s.

### 3.2) Description of other monitoring and evaluation not included in the Performance Indicators (section 3.1) which provides additional information useful for fisheries management.

N/A

### 3.3) Public Outreach

Our main public outreach forum is the Oregon Sport Fishing Regulation pamphlet that provides information on fisheries timing and location, bag limits and tackle restrictions. The pamphlet provides other pertinent information regarding species identification and proper fish release, as well.

Information regarding in-season regulation changes is provided to the public via newspapers and radio.

Oregon State Police officers conduct a large number of public contacts during the angling seasons each year, providing both an enforcement presence and public education.

Numerous cooperative signing efforts with the US Forest Service and Oregon State Parks provide species identification and angling regulation information in high public use areas adjacent to steelhead and trout waters.

### 3.4) Enforcement

An annual enforcement priority setting process is designed to assess need and shift enforcement emphasis to insure resource protection and regulation compliance. Enforcement contacts accomplished by Oregon State Police officers are designed not only to ensure compliance with angling regulations but also to gauge the rate of compliance and to inform the public. Illegal harvest of wild steelhead and trout (in special regulation zones) remain at very low levels. To date, compliance rates for wild fish release regulations have been greater than 90%. If compliance rates begin to decrease additional enforcement and public information effort will be applied to ensure protection of listed stocks.

### 3.5) Schedule and process for reviewing and modifying fisheries management.

#### 3.5.1) Description of the process and schedule that will be used annually to evaluate the fisheries, and revise management assumptions and targets if necessary.

*Annual Review* – Data collected during monitoring activities will be reviewed annually by the Watershed District and appropriate ODFW Portland staff and compared with expected fisheries impact levels and listed population status to insure these parameters are consistent with meeting the FMEP objective (Section 1.1 and 3.1). If incidental mortality associated with FMEP fisheries is determined to pose a risk to viability of listed species, then appropriate seasonal closures, reductions in bag limits or catch and release regulations will be implemented as deemed necessary.

#### 3.5.2) Description of the process and schedule that will occur every 5 years to evaluate whether the FMEP is accomplishing the stated objectives. The conditions under which revisions to the FMEP will be made and how the revisions will likely be accomplished should be included.

Brood year survival for wild summer steelhead in the Snake River ESU can be assessed every five years, given average lengths of freshwater and ocean residency. This FMEP will be evaluated every five years for effectiveness. Comprehensive reviews will be repeated at that interval until such time as the ESU is declared recovered and is delisted. Revisions to this plan will be made as performance indicators suggest that the stated objectives are not being met. Revisions will we undertaken in cooperation with appropriate Portland Headquarters and Region staff, NMFS staff, the interested public and our tribal co-managers. The Technical Review Team will be consulted during the periodic review process. Revision of this FMEP may include changes and updates in the Population Viability Analysis and viable and critical thresholds.

**SECTION 4. CONSISTENCY OF FMEP WITH PLANS AND CONDITIONS SET WITHIN ANY FEDERAL COURT PROCEEDINGS**

The actions and objectives of this FMEP are subject to and consistent with the Columbia River Fish Management Plan (U.S. v Oregon).

This plan is consistent with applicable federal court proceedings.

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